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8 March 1960

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MEMORANDUM FOR : The Record

SUBJECT : Trip Report - Pratt & Whitney, Florida Research & Development Center, 1 and 2 March 1960

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 1. Mr. Kiefer, and the writer, as an observer, met with of Pratt & Whitney, West Palm Beach, on 1 March for a discussion of additive flow rates relative to exhaust gas ionization.

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 (a) presented P & W with data defining ionization as a function of gas temperature, density, metal element, frequency, and additive flow rate. These data established that the additive flow rate required is smaller than previously anticipated by P & W, that the additive flow rate is to be variable thereby necessitating a variable control, and that this variation probably may be accomplished in steps rather than by infinite increment control which would prove more complex.

(b) Several approaches to additive flow rate control were considered and are listed as follows:

<u>FLOW RATE REQUIREMENT</u>	<u>METHOD</u>	<u>REMARKS</u>
Constant	Tank & Valve	Rejected by variable flow rate requirement
Variable with tolerance of $\pm 5\%$ of nominal	Tank, simplified control, valve	Plausible - efforts to be placed in this direction
Widely variable with tolerance of $\pm 5\%$ of nominal	Tank, complex control, valve	Present feeling is that this is not required

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Mr. Kiefer presented the possibility of utilizing a compartmented tank with differing concentrations of additives as means of flow rate step variation control. The writer presented the possibility of utilizing the motor burning concept inherent in the afterburner fuel system as a means of distribution in conjunction with the compartmented tank. P & W presently favors a rotating valve type control integrated with power (throttle) lever angle.

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(e) [redacted] made it clear that altitude environment testing as presently scheduled by P & W is not required as a basis for confirmation of the absorption theory. This feeling was questioned by P & W who feel that this testing is mandatory and should remain their prerogative inasmuch as their proposed work statement dictates "Design and Develop a fuel additive system to meet the installation mission requirements by 1 January 1962."

(d) Mr. Kiefer indicated that the altitude testing question will be considered and that a Project decision would be forthcoming.

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(e) Comparative exhaust gas data were transmitted to [redacted] for further refinement of additive flow rate requirements.

(f) Mr. Kiefer requested a list of refinery personnel contacts for fuels.

2. The writer met with P & W personnel on 2 March for the purpose of further orientation. The following discussions ensued:

(a) Expression of P & W feelings concerning ionization additive altitude testing, ionization program delays, and the question of contractor prerogatives.

(b) A comparison of the proposed engine test program with current military test specifications.

(c) Recent ionization additive carrier tests involving an Ethyl Corp. synthetic compound which proved unsatisfactory as a solvent.

(d) Amplification of engine performance changes contributory to aircraft performance decay since August 1959.

(e) Engine Performance (Non Standard Day). Current P & W data permit evaluation of standard day performance only. Point data for "hot" and "cold" day operation will

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be required for evaluation of engine parameters relative to mission requirements. P & V indicated their intentions of presenting these data soon.

(f) General questions involving current J110-20 engine specifications.

(g) Specification fuel characteristics, refinery contacts, and fuel reference material.

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Development Branch
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